

CLAIMS

What is claimed is:

1. A fuel processing system comprising:

a fuel processor having an fuel processor inlet and a fuel processor outlet;

a combustor having a combustor inlet in fluid communication with said fuel processor outlet and a combustor outlet; and

a recirculation loop including a bypass valve for selectively providing fluid communication between said fuel processor inlet and at least one of said fuel processor outlet and said combustor outlet.

2. The fuel processor system according to Claim 1, further comprising a bypass passage providing fluid communication between said recirculation loop and said combustor inlet.

3. The fuel processor system according to Claim 1 wherein said bypass passage further comprises a check valve to prevent backflow therein.

4. The fuel processor according to Claim 2, wherein said recirculation loop further comprises an exhaust valve for selectively providing fluid communication between said recirculation loop and said combustor inlet.

5. The fuel processor system according to Claim 4, wherein said exhaust valve and said bypass valve are operable together to set a recirculation ratio.

6. The fuel processor system according to Claim 1 further comprising a recirculation valve for controlling fluid communication in said recirculation loop.

7. The fuel processor according to Claim 1, further comprising a recirculation pump in fluid communication with said recirculation loop.

8. The fuel processor according to Claim 7, further comprising a fuel cell having an anode inlet in fluid communication with said fuel processor outlet and an anode outlet, said bypass valve including an anode bypass valve operably disposed between said fuel processor outlet and said anode inlet for selectively providing fluid communication between said anode inlet and said combustor inlet, thereby bypassing said fuel cell.

9. The fuel processor according to Claim 8, further comprising a pressure regulator operably disposed between said anode outlet and said combustor inlet.

10. The fuel processor according to Claim 8, further comprising a pressure regulator operably disposed between said anode bypass valve and said combustor inlet.

11. The fuel processor according to Claim 8, further comprising a cathode bypass valve operably disposed between a cathode air supply and a cathode inlet of said fuel cell for selectively providing fluid communication between said cathode inlet and combustor inlet, thereby bypassing said fuel cell.

12. The fuel processor according to Claim 1, further comprising a condenser in fluid communication with said fuel processor outlet.

13. A fuel processing system comprising:

a fuel processor having a fuel processor inlet and a fuel processor outlet;

a fuel cell having an anode inlet in fluid communication with said fuel processor outlet and an anode outlet;

a combustor having a combustor inlet in fluid communication with said anode outlet and a combustor outlet; and

a recirculation loop including a first valve operably disposed between said fuel processor outlet and said anode inlet for selectively providing fluid communication between said fuel processor outlet and said fuel processor inlet.

14. The fuel processing system according to Claim 13, further comprising a bypass passage providing fluid communication from said recirculation loop to said combustor inlet.

15. The fuel processing system according to Claim 14, further comprising a second valve to selectively control fluid communication between said recirculation loop and said bypass passage.

16. The fuel processing system according to Claim 15 wherein said second valve comprises a check valve to prevent backflow from said bypass passage to said recirculation passage.

17. The fuel processing system according to Claim 15 wherein said first valve and said second valve are operable together to set a recirculation ratio.

18. The fuel processor system according to Claim 13 further comprising a recirculation valve for controlling fluid communication through said recirculation loop.

19. The fuel processing system according to Claim 13, further comprising a recirculation pump in fluid communication with said recirculation loop.

20. The fuel processing system according to claim 19 wherein said recirculation pump is operably disposed between said recirculation loop and said fuel processor inlet.

21. The fuel processor system according to Claim 19, further comprising a pressure regulator operably disposed between said anode outlet and said combustor inlet.

22. The fuel processor system according to Claim 13, further comprising a cathode bypass passage having a second valve operably disposed between a cathode air supply and a cathode inlet of said fuel cell for selectively providing fluid communication between said cathode inlet and combustor inlet, thereby bypassing said fuel cell.

23. The fuel processor system according to Claim 22, further comprising a cathode exhaust in fluid communication with said combustor inlet.

24. The fuel processor system according to Claim 23, further comprising a check valve operably disposed between said cathode exhaust and said combustor inlet to prevent backflow through said fuel cell.

25. The fuel processor system according to Claim 13, further comprising a recirculation air supply in fluid communication with said recirculation loop.

26. The fuel processor system according to Claim 13, wherein said recirculation loop provides fluid communication from said fuel processor outlet through said combustor to said fuel processor inlet.

27. The fuel processor system according to Claim 13, further comprising a condenser in fluid communication with said fuel processor outlet.